EFFICACY OF DEER STOPPER™ REPELLENT FOR REDUCING WHITE-TAILED DEER DAMAGE TO ORNAMENTAL PLANTINGS

JAMES B. ARMSTRONG, Department of Zoology and Wildlife Science and Alabama Agricultural Experiment Station, 331 Funchess Hall, Auburn University 36849-5414

M. KEITH CAUSEY, Department of Zoology and Wildlife Science and Alabama Agricultural Experiment Station, 331 Funchess Hall, Auburn University 36849-5414

JOHN T. OWEN, Piedmont Substation, Alabama Agricultural Experiment Station, P.O. Box 368, Camp Hill, AL 36850

Abstract: A 2-year study was undertaken to assess the efficacy of Deer Stopper™ repellent for reducing white-tailed deer damage to ornamental plantings. Efficacy testing was conducted on a captive deer herd at Auburn University's White-tailed Deer Research Facility and the Stimpson Wildlife Sanctuary, Jackson, AL. Japanese Holly (Ilex crenata), a highly preferred browse species in this area, was used as the test plant at all study sites. Plants were arranged randomly between treatment and control. Treatment plants were sprayed with prescribed applications of Deer Stopper™ and percent defoliation and browsing estimated for each plant. Repeated measures analysis of variance was used to compare effectiveness of treatments. During the first 3 months of the study, deer became acclimated to the plants with little browsing pressure to either treatment or control plants. Once deer began to browse on the shrubs consistently, the mean number of leaves on treatment plants was significantly higher (df=26,1; F=22.11; P=0.000) than the mean number of leaves on control plants. Preliminary analyses of these data suggest that Deer Stopper™ was effective in reducing browsing damage to Japanese Holly.

Key Words: Deer Stopper™, repellent, white-tailed deer

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Deer management has undergone a paradigm shift in recent years. As deer populations have increased, concern over their effect on native habitats and human-altered landscapes is increasing. Traditional management objectives of enhancing deer populations for consumptive uses are being modified to include ways to reduce deer damage to agricultural and ornamental vegetation (Warren 1997). The widespread nature of concern is evidenced by the recent special issue of the *Wildlife Society Bulletin* (Vol. 25:2), a 1995 symposium held in Missouri and dedicated to urban deer management, many articles in the newsletter of the National Animal Damage Control Association, and many papers presented at various symposia dedicated to wildlife damage management. Recent journal articles have focused on biological aspects such as population dynamics (deCalesta and Stout 1997, Miller 1997), control techniques (DeNicola et al. 1997a), and sociological aspects such as conflict resolution (Stout et al. 1992, Curtis et al. 1995) and public attitudes (Fritzell et al. 1997, King 1995) of managing deer damage.

Among wildlife managers, there is much debate over the efficacy of various control techniques. Control measures include exclosures (Owen et al. 1995), repellents (Fargione and Richmond 1995, Lewison et al.1995), immunocontra-ceptives (Warren et al. 1995, DeNicola et al. 1997b), and alternative harvest regimes (Ver Steeg et al. 1995, Horton and Craven 1997).

The objective of this study was to determine the effectiveness of Deer Stopper™ repellent for reducing white-tailed deer damage to ornamental plantings. We wish to thank Frank Boyd, Ashley Rossi, and Ralph Mirarchi for review of this manuscript. We express our appreciation to Traci O'Brien and Jami Armstrong for their assistance in project construction and data collection.

METHODS

Studies were conducted at the Stimpson Wildlife Sanctuary located in Clarke County in southwest

Alabama and managed by the Alabama Game and Fish Division. Stimpson Sanctuary is not open to hunting and is noted for having an excessive deer population. This area was selected because of the history of deer damage on the site.

Initial testing was conducted using captive deer at the Auburn University White-tailed Deer Research Facilities. Deer at the facility were given access to potted Japanese holly (*Ilex crenata*) to verify browsing pressure and measurement techniques. Japanese holly was used for the study based on recommendations from Extension horticulture specialists who deal with deer damage complaints in ornamental plantings.

Once we verified that white-tailed deer will browse Japanese holly, we moved our investigation to the Stimpson sanctuary. Japanese Holly plants were arranged randomly between treatment and control, resulting in 41 pairs for comparison. Treatment plants were sprayed with prescribed applications of Deer Stopper™. Damage was assessed by counting the number leaves on selected dominant stems. Plants were measured and repellent applied each month from January 1995 through December 1995. Monthly re-application of the repellent followed the manufacturer's recommendation. Results of a t-test analysis assured us that treatment and control plants were similar (df=40, t=-0.36, p=0.721) prior to any browsing. Then, repeated measures analysis of variance (ANOVA) (Norusis 1993) was used to detect differences in effectiveness between treatments.

RESULTS AND DISCUSSION

During the first 3 months of the study, little browsing occurred on either treatment or control plants (Table 1). Apparently, this was a neophobic response by deer to the new plants in the area. However, once deer began to browse shrubs consistently, the mean number of leaves on treatment plants generally was higher than the mean number of leaves on control plants (df=26, 1; F=22.11; p=0.000). The overall mean number of leaves for the treatment group was 518.8 as compared to 333.6 for the control group. The largest difference in leaf counts between treatment and control plants occurred in April (130.8 and 30.3, respectively).

A potentially confounding event occurred in May when leaf counts between treatment and control plants again approached equality. The terrain on the study site sloped slightly away from the middle of the plot. Soils in this area are sandy and well-drained. Apparently the stress of drought caused some mortality in study plants on these well-drained soils. Also, treatment plants appeared to be less drought resistant and dropped their leaves more rapidly than control plants. This mortality eventually resulted in the loss of several treatment and control plants.

Table 1. Mean number of leaves on Japanese Holly (*Ilex crenata*) plants treated with Deer Stopper™ repellent (treatment) versus untreated plants (control) at the Stimpson Wildlife Sanctuary, Jackson, AL, as recorded each month during 1995.

Month	Treatment	Control
January	148.5	154.8
February	144.5	160.3
March	140.8	144.9
April	130.8	30.3
May	139.9	130.1
June	161.9	113.9
July	176.3	78.9
August	182.1	78.7
September	187.8	78.6
October	133.5	58.7
November	124.7	60.3
December	126.1	66.1

An examination of leaf counts from June through December indicates that browsing pressure on control plants remained relatively constant. Leaf counts on treatment plants during this period continued to decline. One might speculate that deer continued to browse these plants as natural food sources became more scarce. This would reduce the differential in leaf numbers between treatment and control plants.

MANAGEMENT IMPLICATIONS

Complaints of deer damage in residential areas are common. Within residential areas, use of electric fencing or traditional deer harvests is not conducive, thus alternative ways to reduce damage must be explored. Analyses of our data suggest that Deer Stopper™ repellent was effective in reducing browsing damage to Japanese Holly when applied every 30 days. We believe that ornamental plantings near homes likely would not be as susceptible to drought stress as the treatment plants in our study. Although no repellent has yet been 100% effective in stopping browsing damage, DeerStopper™ seems to be effective in reducing damage to a tolerable level.

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